WHAT IS CLAIMED IS:

1. A crystal pulling apparatus for producing a silicon single crystal grown by the Czochralski process, the apparatus comprising:

a growth chamber; and

a structural component disposed within the growth chamber, the structural component comprising a substrate and a protective layer covering the surface of the substrate that is exposed to the atmosphere of the growth chamber, the substrate comprising graphite and having a concentration of iron no greater than about $1.5*10^{12}$ atoms/cm^3, the protective layer comprising silicon carbide and having a concentration of iron no greater than about $1.0*10^{12}$ atoms/cm^3.

2. The crystal pulling apparatus as set forth in claim 1 wherein the concentration of iron in the substrate is no greater than about $1.0*10^{12}$ atoms/cm^3.

3. The crystal pulling apparatus as set forth in claim 1 wherein the concentration of iron in the substrate is no greater than about $0.5*10^{12}$ atoms/cm^3.

4. The crystal pulling apparatus as set forth in claim 1 wherein the concentration of iron in the substrate is no greater than about $0.1*10^{12}$ atoms/cm.

5. The crystal pulling apparatus as set forth in claim 1 wherein the concentration of iron in the protective layer is no greater than about $0.5*10^{12}$ atoms/cm^3.

6. The crystal pulling apparatus as set forth in claim 1 wherein the concentration of iron in the protective layer is no greater than about $0.1*10^{12}$ atoms/cm^3 of iron.

7. The crystal pulling apparatus as set forth in claim 1 wherein the protective layer is about 75 to about 125 μm thick.

8. The crystal pulling apparatus as set forth in claim 1 wherein the protective layer is about 100 μm thick.

9. The crystal pulling apparatus as set forth in claim 1 wherein the protective layer covers the entire surface of the substrate.

10. The crystal pulling apparatus as set forth in claim 1 wherein the structural component reaches at least about 950°C for at least about 80 hours and is within about 3 cm to about 5 cm of the silicon single crystal or a silicon melt during the growth of the silicon single crystal.

11. The crystal pulling apparatus as set forth in claim 10 wherein the structural component is selected from the group consisting essentially of an upper heater, an upper heater shield, an intermediate heat shield, a lower heat shield inner reflector, a lower heat shield outer reflector, a lower heat shield insulation layer, an upper insulation support and an upper insulation shield.

12. The crystal pulling apparatus as set forth in claim 11 comprising at least six structural components selected from the group.

13. The crystal pulling apparatus as set forth in claim 11 comprising at least eight structural components selected from the group.

14. The crystal pulling apparatus as set forth in claim 1 wherein all the structural components which during the growth of the crystal reach at least about 950°C for at least 80 hours and are within about 3 cm to about 5 cm of the crystal or a silicon melt comprise the substrate and the protective layer.

15. A process for controlling the contamination of a silicon single crystal ingot with iron from a structural component in a crystal growing apparatus during the growth of the silicon single crystal ingot, the process comprising:

constructing the crystal growing apparatus with a growth chamber and a structural component disposed within the growth chamber, the structural component comprising a substrate and a protective layer covering the surface of the substrate that is exposed to the atmosphere of the growth chamber, the substrate comprising graphite and having a concentration of iron no greater than about $1.5*10^{12}$ atoms/cm^3, the protective layer comprising silicon carbide and having a concentration of iron no greater than about $1.0*10^{12}$ atoms/cm^3; and

pulling the silicon single crystal ingot from a pool of molten silicon within the growth chamber.

16. The process as set forth in claim 15 wherein the concentration of iron in the substrate is no greater than about $1.0*10^{12}$ atoms/cm^3.

17. The process as set forth in claim 15 wherein the concentration of iron in the substrate is no greater than about $0.5*10^{12}$ atoms/cm^3.

18. The process as set forth in claim 15 wherein the concentration of iron in the substrate is no greater than about $0.1*10^{12}$ atoms/cm.

19. The process as set forth in claim 15 wherein the concentration of iron in the protective layer is no greater than about $0.5*10^{12}$ atoms/cm^3.

20. The process as set forth in claim 15 wherein the concentration of iron in the protective layer is no greater than about $0.1*10^{12}$ atoms/cm^3 of iron.

21. The process as set forth in claim 15 wherein the protective layer is about 75 to about 125 μm thick.

22. The process as set forth in claim 15 wherein the protective layer is about 100 μm thick.

23. The process as set forth in claim 15 wherein the protective layer covers the entire surface of the substrate.

24. The process as set forth in claim 15 wherein the structural component reaches at least about 950°C for at least about 80 hours and is within about 3 cm to about 5 cm of the silicon single crystal or the pool of molten silicon during the growth of the silicon single crystal.

25. The process as set forth in claim 24 wherein the structural component is selected from the group consisting essentially of an upper heater, an upper heater shield, an intermediate heat shield, a lower heat shield inner reflector, a lower heat shield outer reflector, a lower heat shield insulation layer, an upper insulation support and an upper insulation shield.

26. The process as set forth in claim 25 comprising constructing the crystal growing apparatus with at least six structural components selected from the group.

27. The process as set forth in claim 25 comprising constructing the crystal growing apparatus with at least eight structural components selected from the group.

28. The process as set forth in claim 15 comprising constructing the crystal growing apparatus such that all the structural components which during the growth of the crystal reach at least about 950°C for at least 80 hours and are within about 3 cm to about 5 cm of the crystal or a silicon melt comprise the substrate and the protective layer.

29. The process as set forth in claim 15 wherein the silicon single crystal ingot comprises a main body that has an edge iron concentration less than that of a reference silicon single crystal ingot pulled in a reference growth chamber operated under identical conditions and constructed of identical components except having a reference structural component with a concentration of iron greater than about $1.4*10^{15}$ atoms/cm^3.

30. The process as set forth in claim 26 wherein the silicon single crystal ingot comprises a main body that has an edge iron concentration below about 5 ppta.

31. The process as set forth in claim 26 wherein the silicon single crystal ingot comprises a main body that has an edge iron concentration below about 3 ppta.

32. The process as set forth in claim 27 wherein the silicon single crystal ingot comprises a main body that has an edge iron concentration below about 1 ppta.

33. The process as set forth in claim 28 wherein the silicon single crystal ingot comprises a main body that has an edge iron concentration below about 1 ppta.